भारतीय मानक
Indian Standard

IS 1448 (Part 89) : 2023

पेट्रोलियम और उसके उत्पादों के परीक्षण की विधि

भाग 89 स्नेहक ग्रीस की तापीय स्थिरता के लिए परीक्षण

(पहला पुनरीक्षण)

Methods of Test for Petroleum and Its Products

Part 89 Test for Thermal Stability of Lubricating Greases

(First Revision)

ICS 75.100

© BIS 2023

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली - 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI - 110002
www.bis.gov.in www.standardsbis.in

May 2023 **Price Group 4**

Methods for Sampling and Test for Petroleum and Related Products of Natural or Synthetic Origin (Excluding Bitumen) Sectional Committee, PCD 01

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Methods for Sampling and Test for Petroleum and Related Products of Natural or Synthetic Origin (Excluding Bitumen) Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

This standard was first published in 1979, which was subsequently reprinted in 1985. The first revision has been brought out to keep pace with the latest technological developments and international practices. In this revision following major changes have been made:

a) New clauses for sampling, reporting, precision and bias have been incorporated; and
b) Tolerance for temperature and time of testing have been specified in the procedure.

In the preparation of this standard, considerable assistance has been derived from ASTM D 6184-17 ‘Standard Test Method for Oil Separation from Lubricating Grease (Conical Sieve Method)’.

The composition of the committee responsible for the formulation of this standard is listed in Annex A.

In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’.

Indian Standard

METHODS OF TEST FOR PETROLEUM AND ITS PRODUCTS
PART 89 TEST FOR THERMAL STABILITY OF LUBRICATING GREASES

(First Revision)

1 SCOPE

1.1 This Standard prescribes a procedure for measuring the tendency of lubricating greases to separate oil at elevated temperature under static conditions.

1.2 This test method is suitable for use with most of the greases, but the test precision was established using greases having worked penetration greater than 220 and less than 340.

2 APPARATUS

2.1 Test Apparatus

The assembled apparatus comprises of a cone-shaped sieve made out of woven nickel wire cloth with uniform aperture of 250 microns, a beaker of 200 ml capacity without a pouring spout, and a close-fitting cover with a hook in the center for suspending the cone, as shown in Fig. 1.

2.2 Oven — Capable of maintaining 100 °C ± 0.5 °C

2.3 Balance — Capable of weighing up to 250 g with a least count of 0.01 g

3 SAMPLING

Take about 10 ml of sample to fill the sieve to approximately the same level as indicated in Fig. 1 for each test. The same volume shall be used for each test, though there may be variations in the density of grease.

NOTE — Sample shall be free from any sign of non-homogeneity such as gross contamination, oil separation, or phase changes.

4 PROCEDURE

4.1 Clean the sieve, beaker, and cover with a suitable solvent and dry it.

NOTE — Ensure that the sieve is clean and free of deposits that could affect the passage of oil. The sieve should be free of any screen irregularities such as creases, dents, tears, or diminished or enlarged openings. An ultrasonic solvent bath may be used to effectively clean the sieve.

4.2 Preheat the oven to the test temperature of 100 °C ± 0.5 °C. Weigh the beaker to the nearest 0.01 g. Also weigh the assembled apparatus consisting of the sieve, cover, and beaker as shown in Fig. 1 to the nearest 0.01 g.

4.3 With a spatula, fill the cone sieve with grease approximately to the level shown in Fig. 1, avoiding the inclusion of air. The grease shall not be forced through the screen. To prevent trapping free oil, shape the top of the grease into a slightly convex surface and smoothen it. Assemble the entire apparatus as shown in Fig. 1, and weigh to the nearest 0.01 g. Calculate the mass of the grease by difference.

4.4 Place the assembled apparatus in the oven for 30 h ± 0.25 h at 100 °C ± 0.5 °C. Take out the apparatus from the oven and cool it to room temperature. Remove the cone from the beaker, tapping it gently against the inside of the beaker to take off any oil adhering to its tip. Weigh the beaker containing the separated oil to the nearest 0.01 g.

4.5 After completion of the test, clean the apparatus without delay to prepare for subsequent testing.

5 CALCULATION

Calculate the oil separation as the percentage separated from the original sample as follows:

$$\text{Oil Separation, percent} = \frac{(B-A)}{M} \times 100$$

where

B = mass of the beaker after heating, in g;

A = mass of the beaker before heating, in g; and

M = mass of the sample tested, in g.

6 REPORTING

Report the oil separation to the nearest 0.1 percent.

7 PRECISION AND BIAS

7.1 The repeatability and reproducibility of the test method as determined by statistical examination of the inter laboratory results are as follows:

7.1.1 *Repeatability*

The difference between two test results, obtained by the same operator with the same apparatus under constant specified operating conditions on identical test material would, in the long run, in the normal and correct operation of the test method, exceed the following values only in one case in twenty:

Repeatability, percent oil separation =1.51 × (M) 0.5

where

M = mean of two determinations.

7.1.2 *Reproducibility*

The difference between two single and independent results by two different operators working in different laboratories on identical test material would, in the long run, in the normal and correct operation of the test method, exceed the following values only in one case in twenty:

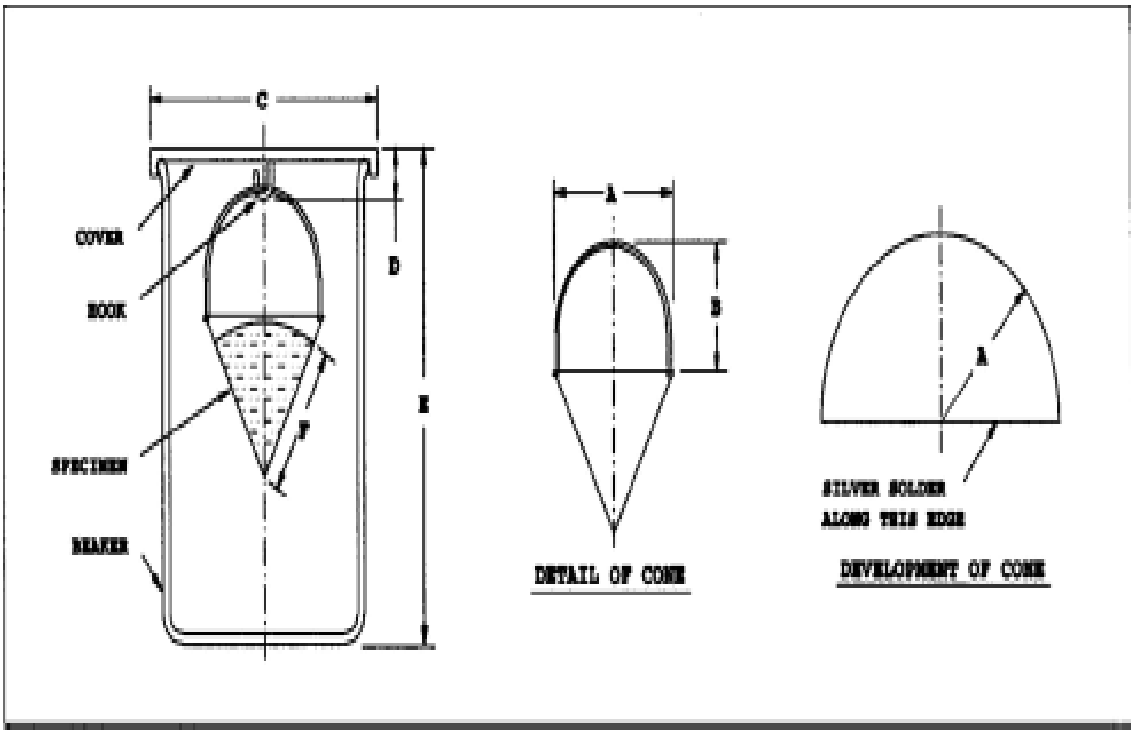
Reproducibility, percent oil separation =1.517 × (M) 0.5

where

M = mean of two determinations.

7.2 Bias

There is no bias for measuring the oil separation with this test method because the value of the oil loss is defined only in terms of this test method.



A	38.1 mm ± 0.3 mm
B	27.0 mm ± 0.3 mm
C	~ 70 mm
D	9.7 mm ± 3.3 mm
E	~ 100 mm
F	~ 36 mm

FIG. 1 APPARATUS FOR TESTING THERMAL STABILITY

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Methods for Sampling and Test for Petroleum and Related Products of Natural or Synthetic Origin (Excluding Bitumen) Sectional Committee, PCD 01

Organization	*Representative(s)*
Indian Institute of Petroleum, Dehradun	Dr Anjan Ray(***Chairperson***)
Air Headquarters, Ministry of Defence, New Delhi	Wg Cmdr S. A. Tawab Wg Cdr D. Anandraj Roy (*Alternate*)
All India Instrument Manufacturers and Dealers Association, Mumbai	Prof G. M. Rao
Bharat Oman Refineries Limited, Bina	Shrimati Asawari Kelkar Shri B. Sridhar (*Alternate*)
Bharat Petroleum Corporation Limited, Mumbai	Shri R. Subramanian Shri C. Shanmuganathan (*Alternate*)
Castrol India Limited, Mumbai	Shri Raman Rai
Central Institute of Plastics Engineering and Technology, Bhuwaneshwar	Dr Smita Mohanty
Central Revenue Control Laboratory, New Delhi	Shri V. Suresh
Chennai Petroleum Corporation Limited, Chennai	Dr V. Selvavathi Shri H. Ramakrishnan (*Alternate*)
CSIR - Central Institute for Mining and Fuel Research, Dhanbad	Shri S. R. K. Rao Shri P. K. Singh (*Alternate* I) Shri S. Dutta (*Alternate* II)
Directorate General of Aeronautical Quality Assurance, New Delhi	Shri Santosh Namdeo
Directorate General of Quality Assurance, Ministry of Defence, Kanpur	Dr Om Prakash Singh Shri A. K. Kanaujia (*Alternate*)
Elico Limited, Hyderabad	Shri T. V. Shiva K. Rao Shri N. Raju (*Alternate*)
GAIL (India) Limited, New Delhi	Dr Nityananda Panda Dr S. Mahanty (*Alternate*)
Gulf Oil Lubricants India Limited, Mumbai	Shri Sanjay Kumar Shri Mayuresh Godbole (*Alternate* I) Shri S. Ganesh (*Alternate* II)
Hindustan Petroleum Corporation Limited, Mumbai	Shri Elecheran Kumar Shri Santosh Dhaku Bhogale (*Alternate* I) Shri Mahesh Totla (*Alternat*e II)
HPCL Mittal Energy Limited, Noida	Shri Satyabrata Bandyopadhyay Shri Narendra Kumar Gupta (*Alternate*)

Organization	*Representative(s)*
Indian Oil Corporation (MKTG), Mumbai	Shri A. S. Krishnamoorthy Dr Sreekumar N. Veedu (*Alternate*)
Indian Oil Corporation (R & D Centre), Faridabad	Dr S. K. Majumdar
Indian Oil Corporation Limited - Refineries and Pipelines Division, New Delhi	Dr Shashi Pal Singh Dr Ashutosh Mishra (*Alternate*)
Indraprastha Gas Limited, New Delhi	Shri P. K. Pandey Shri Rahul Nigam (*Alternate*)
Lubrizol India Limited, Mumbai	Shri Anil Mane Shrimati Reena Kuril (*Alternate*)
Mangalore Refinery and Petro Chemical Limited, Mangalore	Shri Yogeesha Shri Anitha Shetty (*Alternate* I) Shri R. M. Praksah (*Alternate* II)
Ministry of Railways, Lucknow	Shri Rajesh Srivastava Shri Sonam Gupta (*Alternate*)
National Test House, Kolkata	Shri K. C. Naskar Shri P. K. Chakraborty (*Alternate*)
Nayara Energy Limited, Mumbai	Shri Mriganka Tarafdar Shri Dhiraj Gondalia (*Alternate*)
Numaligarh Refinery Limited, Golaghat	Shri Sobhan Konwar Shri Anjan Kalita (*Alternate*)
Oil and Natural Gas Corporation Limited, New Delhi	Shri Gour Mohan Dass Shrimati Leena John (*Alternate* I) Shri Dinesh S. R. Reddy Kakuturi (*Alternate* II)
Oil India Limited, Duliajan	Shri B. C. Datta
Petroleum and Natural Gas Regulatory Board, New Delhi	Shri Anil Meghani Shri Noor Khan (*Alternate*)
Petroleum Conservation Research Association, New Delhi	Shri Surendra Pratap Shri M. P. Bangwal (*Alternate*)
Reliance Industries Limited, Mumbai	Shri Pramod Mall
Shriram Institute for Industrial Research, Delhi	Dr Rajesh Kumar Dr Mukesh Garg (*Alternate*)
BIS Directorate General	Shrimati Meenal Passi, Scientist 'F'/Senior Director and Head (Petroleum, Coal and Related Products) [Representing Director General (*Ex-officio*)]

Member Secretary
Shri Hari Mohan Meena
Scientist 'C'/Deputy Director
(Petroleum, Coal and Related Products), BIS

This Page has been Intentionally left blank

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 2016 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Head (Publication & Sales), BIS.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website-www.bis.gov.in or www.standardsbis.in.

This Indian Standard has been developed from Doc No.: PCD 01 (18725).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402 *Website*: www.bis.gov.in

Regional Offices: *Telephones*

Central : 601/A, Konnectus Tower -1, 6th Floor, DMRC Building, Bhavbhuti Marg, New Delhi 110002 { 2323 7617

Eastern : 8th Floor, Plot No 7/7 & 7/8, CP Block, Sector V, Salt Lake, Kolkata, West Bengal 700091 { 2367 0012, 2320 9474

Northern : Plot No. 4-A, Sector 27-B, Madhya Marg, Chandigarh 160019 { 265 9930

Southern : C.I.T. Campus, IV Cross Road, Taramani, Chennai 600113 { 2254 1442, 2254 1216

Western : Plot No. E-9, Road No.-8, MIDC, Andheri (East), Mumbai 400093 { 2821 8093

Branches : AHMEDABAD. BENGALURU. BHOPAL. BHUBANESHWAR. CHANDIGARH. CHENNAI. COIMBATORE. DEHRADUN. DELHI. FARIDABAD. GHAZIABAD. GUWAHATI. HIMACHAL PRADESH. HUBLI. HYDERABAD. JAIPUR. JAMMU & KASHMIR. JAMSHEDPUR. KOCHI. KOLKATA. LUCKNOW. MADURAI. MUMBAI. NAGPUR. NOIDA. PANIPAT. PATNA. PUNE. RAIPUR. RAJKOT. SURAT. VISAKHAPATNAM.

Published by BIS, New Delhi